

What is claimed is:

1        1.     A communication terminal which has functions of disassembling  
2        multiplexed signals obtained by multiplexing data into cells of fixed length,  
3        adding each of the cells with a header containing destination information  
4        and transmitting/receiving the cell added to the header through a  
5        communication line, comprising:  
6                a discriminator for referring to the destination information of each  
7        of cells which are received through the communication line to discriminate,  
8        with regard to the cells, whether the cell is addressed to the communication  
9        terminal concerned (hereinafter referred to as "self communication  
10       terminal") or other communication terminals;  
11                a multiplexed signal generator for multiplexing data to be  
12       transmitted from said self communication terminal itself to generate a  
13       multiplexed signal;  
14                a cell-forming unit for forming the multiplexed signal generated in  
15       the multiplexed signal generator into a cell; and  
16                a cell re-multiplexer for re-multiplexing the cells generated by said  
17       cell-forming unit and the cells addressed to the other communication  
18       terminals which are discriminated in said discriminator.

1        2.     The communication terminal as claimed in claim 1, further  
2        comprising first input and output terminals and second input and output  
3        terminals, wherein said communication terminal discriminates and re-  
4        multiplexes cells received through said first input terminal through said

5 communication line and then transmits the re-multiplexed cells from said  
6 first output terminal, and also discriminates and re-multiplexes cells  
7 received through said second input terminal and then transmits the re-  
8 multiplexed cells from said second output terminal.

1 3. The communication terminal as claimed in claim 1, further  
2 comprising bypass means for directly transmitting said received cells when  
3 abnormality occurs in said communication terminal.

1 4. The communication terminal as claimed in claim 2, further  
2 comprising bypass means for short-circuiting said input terminal and said  
3 output terminal to each other when abnormality occurs in said  
4 communication terminal.

1 5. A communication system comprising  $n$  ( $n$  represents an integer)  
2 communication terminals, each of which has functions of disassembling into  
3 cells a multiplexed signal of fixed length obtained by multiplexing data,  
4 adding a header containing destination information to each of the cells and  
5 then transmitting/receiving the cells through a communication line, wherein  
6 each of said communication terminals comprises:  
7 a discriminator for discriminating a cell addressed thereto and a  
8 cell addressed to another communication terminal by referring to the  
9 destination information of the cell received from an input terminal through  
10 said communication line;

11 a multiplexed signal generator for multiplexing data to be  
12 transmitted from the self communication terminal to generate a multiplexed  
13 signal;

14 a cell-forming unit for forming the multiplexed signal generated in  
15 said multiplexed signal generator into a cell; and

16 a cell re-multiplexing unit for re-multiplexing the cell which is to  
17 be transmitted from said self communication terminal and generated from  
18 the multiplexed data, and cells which are discriminated by said  
19 discriminator and addressed to the other communication terminals, and  
20 transmitting the re-multiplexed cells from said output terminal to said  
21 communication line, wherein:

22 the output terminal of a first communication terminal and the input  
23 terminal of a second communication terminal in said plural communication  
24 terminals are connected via a communication line,

25 the output terminal of an  $i$ -th ( $i$  represents an integer of 1 or more  
26 and  $(n-1)$  or less) is connected to the input terminal of an  $(i+1)$ -th  
27 communication terminal,

28 the output terminal of an  $(n-1)$ -th communication terminal is  
29 connected to the input terminal of an  $n$ -th communication terminal, and

30 the output terminal of the  $n$ -th communication terminal is connected  
31 to the input terminal of said first communication terminal, whereby a ring-  
32 shaped transmission path is constructed among  $n$  communication terminals  
33 so that data communication can be performed through said transmission  
34 path among said  $n$  communication terminals.

1 6. The communication system as claimed in claim 5, wherein:

2           said communication terminal further comprises a pair of input  
3   and output terminals,  
4           the output terminal of said n-th communication terminal is  
5   connected to the (n-1)-th communication terminal, the output terminal of  
6   said (i+1)-th communication terminal is connected to the input terminal of  
7   said i-th communication terminal, and  
8           the output terminal of said first communication terminal is  
9   connected to the output terminal of said n-th communication terminal,  
10   whereby a second ring is formed among said n communication terminals.

1       7.    A communication terminal for disassembling a multiplexed signal  
2   obtained by multiplexing data into cells of fixed length, and  
3   transmitting/receiving the multiplexed signal through a communication line,  
4   comprising:  
5       a multiplexed signal generator for multiplexing data to be  
6   transmitted from said self communication terminal, thereby generating a  
7   multiplexed signal;  
8       a cell-disassembling unit for disassembling the cells received  
9   through said communication line to assemble a multiplexed signal; and  
10       a cell multiplexing unit for forming the multiplexed signal  
11   assembled and the multiplexed signal generated in said multiplexed signal  
12   generator into cells, and transmitting the cells through said communication  
13   line.

1       8.    The communication terminal as claimed in claim 7, further  
2   comprising a bypass for short-circuiting a reception system and a

3 transmission system of said communication line when abnormality occurs in  
4 said communication terminal.

1 9. The communication terminal as claimed in claim 7, wherein said  
2 cell-disassembling unit assembles plural multiplexed signals, and comprises  
3 first storage means for storing a first multiplexed signal of the plural  
4 multiplexed signals, second storage means for storing a second multiplexed  
5 signal, third storage means for storing the multiplexed signal generated in  
6 said multiplexed signal generator, fourth storage means for storing the data  
7 other than the multiplexed signal to be transmitted from said  
8 communication terminal, and read-out control means for controlling the  
9 read-out of the multiplexed signals stored in said first to fourth storage  
10 means, and wherein said cell multiplexing unit forms the multiplexed  
11 signals read out by said read-out control means into cells and transmits the  
12 cells thus obtained.

1 10. The communication terminal as claimed in claim 9, wherein, when  
2 a multiplexed signal on a control signal is stored in said second storage  
3 means, said read-out control means controls the read-out timing of the  
4 multiplexed signal on the control signal stored in said fourth storage means.

1 11. The communication terminal as claimed in claim 7, further  
2 comprising first and second input terminals and first and second output  
3 terminals, wherein said multiplexing unit cell-multiplexes the multiplexed  
4 signal generated thereby and the multiplexed signal corresponding to the  
5 cell received through said first input terminal and then transmitting the

6 cell-multiplexed signal through said first output terminal, and cell-  
7 multiplexes the multiplexed signal generated thereby and th multiplexed  
8 signal corresponding to the cell signal received through said second input  
9 terminal, and then transmits the cell-multiplexed signal through said second  
10 output terminal.

1 12. A communication terminal having functions of disassembling a  
2 multiplexed signal obtained by multiplexing data into cells of fixed length,  
3 adding a header containing destination information to each of the cells and  
4 transmitting/receiving the cells through a communication line, comprising:  
5 a cell-disassembling unit for disassembling cells received through  
6 said communication line and assembling a multiplexed signal for every  
7 destination information by referring to destination information;  
8 a multiplexed signal generator for multiplexing data to be  
9 transmitted from the communication terminal in question;  
10 a re-multiplexing unit for re-multiplexing the multiplexed signal  
11 generated in said multiplexed signal generator and the multiplexed signals  
12 addressed to other communication terminals in the multiplexed signals  
13 assembled; and  
14 a cell-forming unit for forming said re-multiplexed multiplexed  
15 signals into cells and transmitting the signals formed into the cells through  
16 a communication line.

1 13. The communication terminal as claimed in claim 12, further  
2 comprising first and second input and output terminals, wherein said  
3 communication terminal disassembles the cells received from said first input

4 terminal through said communication line and re-multiplexes the  
5 multiplexed signals, and transmits the resulting signals from said first  
6 output terminal while disassembling the cells received through said second  
7 input terminal and re-multiplexing the multiplexed signals and then  
8 transmitting the resulting signals from said second output terminal.

1 14. The communication terminal as claimed in claim 12, further  
2 comprising bypass means for directly transmitting the received cells when  
3 abnormality occurs in said communication terminal.

1 15. A communication system comprising a plurality of communication  
2 terminals for disassembling a multiplexed signal obtained by multiplexing  
3 data into cells of fixed length and transmitting/receiving the cells through a  
4 communication line, wherein:

5 said plurality of communication terminals are connected in series  
6 on a communication path,

7 communication terminals located at both ends in said plurality of  
8 communication terminals connected in series are respectively connected to  
9 each other through a communication line to form a ring-configuration  
10 communication path among said communication terminals, and

11 each of said plurality of communication terminals assembles a  
12 multiplexed signal from cells received through said communication line, and  
13 receives a multiplexed signal addressed thereto while cell-multiplexing and  
14 transmitting multiplexed signals addressed to other communication  
15 terminals and the multiplexed signal obtained by multiplexing data to be

16 transmitted from the communication terminal in question, together with the  
17 assembled multiplexed signal.

1 16. A communication system comprising a plurality of communication  
2 terminals for disassembling a multiplexed signal obtained by multiplexing  
3 data into cells of fixed length and transmitting/receiving the cells through a  
4 communication line, wherein:

5 said plurality of communication terminals are connected in series  
6 to one another on two communication paths which are different from each  
7 other in communication direction,

8 communication terminals located at both ends in said plural  
9 communication terminals connected in series through said two  
10 communication paths are connected to each other through two  
11 communication lines having different communication directions, thereby  
12 forming a dual ring-configuration communication path between said  
13 communication terminals, and

14 each of said plurality of communication terminals assembles a  
15 multiplexed signal from cells received through said two communication  
16 paths, and receives a multiplexed signal addressed thereto while cell-  
17 multiplexing and transmitting multiplexed signals addressed to other  
18 communication terminals and the multiplexed signal obtained by  
19 multiplexing data to be transmitted from the communication terminal in  
20 question, together with the assembled multiplexed signal.